ANOPP2 Class Description

April 21^{st} 2016 from 8am to 12pm and 1pm to 5pm
NASA Langley Research Center, Building 2102, Room 203

NASA's 2^{nd} generation Aircraft NOise Prediction Program (ANOPP2) provides a capability that can be used to assess aircraft noise from current and future aircraft. The ANOPP2 framework is designed to facilitate the combination of acoustic approaches of varying fidelity for the analysis of noise from conventional and unconventional aircraft. ANOPP2 integrates noise prediction and propagation methods, including those found in ANOPP, into a unified system that is compatible for use within general aircraft analysis software. Three training courses will be offered following the Acoustics Technical Working Group (ATWG).

Course 1: ANOPP2 Introduction (Same course offered last year)

The first course, from 8am to 12pm, will provide students with a brief overview of ANOPP2, including execution of ANOPP2's noise prediction capabilities. Unlike its predecessor, ANOPP2 is composed of a series of Application Programming Interfaces (APIs) each with different functionality that can be utilized by the user. While all of the APIs within ANOPP2 contain unique features that will not be covered during training, many capabilities will be discussed, in particular those that directly facilitate a noise prediction from a conventional aircraft. During the course, the students will be able to execute ANOPP2 as directed by the instructor at their own desk using a supplied computer and be able to choose Fortran, C++, or Python as their language of choice. These functionalities include the following:

Using ANOPP2's

- prediction capabilities to execute an existing ANOPP input deck.
- Observer API to calculate metrics and export information to an external TECPLOT file for plotting.
- Flight Path, Propulsion, and Atmosphere APIs to define an aircraft's flight path, an aircraft's propulsion system, and the atmospheric conditions.
- capability to modify a source hemisphere from ANOPP and propagate the modified noise to the ground.
- NetCDF and interpolation capabilities to interpolate a noise database for specific flight conditions.
- capability to correct for wind tunnel and flight effects.
- Plugin System to load a user-generated prediction capability.
- Macro System to execute user-generated commands.

Course 2: Creating a Functional Module (Plugin)

The second course, from 1pm to 3pm, will focus on user generated noise prediction functional modules called "plugins". Plugins can be written and compiled into libraries, without assistance from the ANOPP2 development team, and passed to a third party without the third party having access to the source code. This feature facilitates capability sharing between users of ANOPP2 without source code sharing. Three examples will be presented, discussed, modified, and executed by participants of the course, including integrating source noise prediction and propagation algorithms into the ANOPP2 framework and coupling ANOPP2 and prediction algorithms with Microsoft Excel and retrieving information from the internet.

Course 3: Integrating Measurement Databases into ANOPP2

ANOPP2 offers several features that aid users in integrating measurement databases into the ANOPP2 framework. Features include a NetCDF reader, extensive interpolation capabilities (structured and scattered) of several different types of acoustic metrics, scaling to full-scale, and easy application of flight effects including Doppler and Convective Amplification. The third course, offered from 3pm to 5pm, includes several examples where measurement databases are read, interpolated, and otherwise modified by the ANOPP2 framework for their integration into an aircraft system noise assessment. Results based on the measurement database are integrated into representative system noise assessments.

Additional information

- Class has no cost and no refreshments will be served. Breakfast and lunch are available in the downstairs cafeteria. Drinks and snacks are available in the downstairs snackbar area.
- Webex available, additional information will be sent out closer to class date.
- ANOPP2 will be installed on computers in classroom. If approved for release, ANOPP2 will be distributed to webex participants just prior to the meeting and participants can follow instructions using webex.
- Classroom size is limited, please sign up on the TWG website during registration. Additional courses will be offered on April 22^{nd} if needed.

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